

Claims

- [c1] 1. An image capturing device for capturing a light ray, comprising:
a lens having a light axis;
an image sensing device on said light axis, said light ray being focused by said lens to be projected onto said image sensing device, said image sensing device including a plurality of sensing cells; and
a plurality of microlenses on said plurality of sensing cells, each of said plurality of microlenses having a top surface and a bottom surface, said top surface having a plurality of notches as an input window for changing an incident angle of said light ray, said bottom surface having a plurality of round curves as an output window for further focusing said light ray.
- [c2] 2. The device of claim 1, wherein each of said plurality of notches has a same slope.
- [c3] 3. The device of claim 1, wherein each of said plurality of notches has a different slope, and said slopes decrease gradually from an outermost notch to an innermost notch.

- [c4] 4. The device of claim 1, wherein each of said plurality of the round curves has a semicircle cross-section.
- [c5] 5. The device of claim 1, wherein said image sensing device is a charge-coupled device.
- [c6] 6. The device of claim 1, wherein said image sensing device is a CMOS device.
- [c7] 7. A scanning module for scanning a document, comprising:
- a chassis;
 - a light source on said chassis for emitting a light ray on said document;
 - a plurality of reflectors inside said chassis;
 - a lens inside said chassis;
 - an image sensing device inside said chassis, an image of said document being reflected by said plurality of reflectors and formed on said image sensing device, said image sensing device including a plurality of sensing cells;
 - and
 - a plurality of microlenses on said plurality of sensing cells, each of said plurality of microlenses having a top surface and a bottom surface, said top surface having a plurality of notches as an input window for changing an incident angle of said light ray, said bottom surface having a plurality of round curves as an output window for

further focusing said light ray.

- [c8] 8. The device of claim 7, wherein each of said plurality of notches has a same slope.
- [c9] 9. The device of claim 7, wherein each of said plurality of notches has a different slope, and said slopes decrease gradually from an outermost notch to an innermost notch.
- [c10] 10. The device of claim 7, wherein each of said plurality of round curves has a semicircle cross section. 11. The device of claim 7, wherein said image sensing device is a charge-coupled device. 12. The device of claim 7, wherein said image sensing device is a CMOS device.